Department of Pesticide Regulation

Brian R. Leahy
Director

Edmund G. Brown Jr.
Governor

M E M O R A N D U M

TO: Kevin Solari **HSM-16004**
Environmental Program Manager I
Worker Health and Safety Branch
(916) 323-7614

FROM: Leslie Crowl *(Original signed by L. Crowl)*
Environmental Scientist
Worker Health and Safety Branch
(916) 445-4222

Michael Zeiss *(Original signed by M. Zeiss)*
Senior Environmental Scientist (Specialist)
Worker Health and Safety Branch
(916) 323-2837

DATE: October 25, 2016

SUBJECT: PROPARGITE MITIGATION SCOPING DOCUMENT

Attached is a mitigation scoping document for registered pesticide products containing propargite as an active ingredient. All actively registered labels (currently a total of 3) were reviewed, as well as pesticide use data, pesticide illness data, and other pertinent information. Based on this information, this document is intended to lay the groundwork for the mitigation process in the event that the Department of Pesticide Regulation's Executive Office determines mitigation is needed for propargite.

If you have any comments or questions, please contact me at the number listed above.

Attachment

California Environmental Protection Agency

Department of Pesticide Regulation
Worker Health and Safety Branch

HSM-16004

PROPARGITE
MITIGATION SCOPING DOCUMENT
October 25, 2016

Leslie Crowl, Environmental Scientist
Michael Zeiss, Senior Environmental Scientist (Specialist)
Human Health Mitigation Program
1001 I Street, P.O. Box 4015, Sacramento, CA 95812-4015
(916) 445-4222; Fax (916) 445-4280; www.cdpr.ca.gov

Table of Contents

I. Summary

Propargite is a contact active, non-systemic organosulfite miticide/acaricide used in California to control several species of spider mites on a wide variety of agricultural crops. No propargite uses are registered for residential, recreational, or other public settings in the United States. Propargite's mode of action involves the inhibition of magnesium-stimulated ATPase and its primary mechanism of toxicity in mammals is local irritation at the site of contact. Propargite trade names include Comite, Omite 6E, and Omite 30WS.

The reported use of propargite in California averaged 276,263 pounds (lbs) active ingredient (AI) per year from 2010 to 2014. The major use crops were almonds, corn, and walnuts.

From 2011-2014 two incidents were reported as associated with propargite in California. The first incident occurred in 2012 and involved three fieldworkers exposed via drift. The second incident occurred in 2013 and resulted in one fieldworker experiencing symptoms possibly due to drift.

Based on the information on the product labels, exposure scenarios were evaluated by the Department of Pesticide Regulation's (DPR's) Human Health Assessment (HHA) Branch for handlers, fieldworkers, and bystanders. The Risk Characterization Document (RCD) compiled by HHA identified relatively high non-cancer risks for the majority of handler and fieldworker exposure scenarios. Similarly, estimated cancer risks were relatively high for all handler and fieldworker scenarios. The summary information in this scoping document is intended to aid in the mitigation process if DPR determines mitigation is needed.

II. Purpose

During the risk assessment process, DPR evaluates current pesticide use practices, chemical toxicity, and the potential for adverse effects associated with a given pesticide, and determines if action is needed to further reduce the risk of exposure. DPR identified propargite as having potential adverse health effects in studies of sufficient quality to allow risk characterization (Lewis 2014).

This scoping document establishes the groundwork for potential mitigation development by reviewing the exposure scenarios relevant to California and their respective margins of exposure (MOEs), as well as the protective measures identified on currently registered pesticide labels. The synthesis of this information can then be used for the development of mitigation measures for propargite, if needed.

III. Regulatory History / Status

Propargite was first registered in 1969 by the United States Environmental Protection Agency (U.S. EPA) as a miticide. In September 2001, U.S. EPA finalized their Reregistration Eligibility Document (RED) which resulted in proposed mitigation for worker/handler exposure, including changes in the packaging of some formulations, increased protective equipment (e.g., gloves, closed mixing systems, enclosed cabs and cockpits) and increased restricted entry intervals (REIs). In 2014, the U.S. EPA initiated a registration review of propargite in accordance with

Section 3(g) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which requires the U.S. EPA to review each registered pesticide every 15 years. As part of this registration review, the U.S. EPA is reviewing updated data on human exposure as it relates to diet, drinking water, and occupational use. The U.S. EPA expects to complete their review by 2020.

Propargite was first registered for use in California in 1983. In 2004, DPR completed a RCD addressing the potential risk for human health effects from dietary and drinking water exposure to propargite (Lewis, 2004). In 2014, DPR completed a RCD for occupational and ambient air exposure (Lewis 2014). The RCD for dietary and drinking water exposure did not identify exposures of concern; however, the RCD for occupational and ambient air exposure did identify exposures of concern for applicators, fieldworkers, and bystanders.

The California regulatory status for propargite is summarized below (Table 1).

Table 1: California Regulatory Status of Propargite as of October 2016

	Restricted Material	**Toxic Air Contaminant**	**Groundwater Protection List**	**Proposition 65 List**
Yes / No	Yes[a]	No	No	Yes (listed for both cancer and developmental toxicity)
Laws	FAC Division 7, Chapter 3, Article 1, Section 14001	FAC Division 7, Chapter 3, Article 1.5, Section 14021(b)	FAC Division 7, Chapter 2, Article 15, Section 13141	Health & Safety Code, Section 25249.5
Regulations	3 CCR, Section 6400	3 CCR, Section 6860	3 CCR, Section 6800	27 CCR, Section 25000 to 27001

a Due to its status as a Federal Restricted Use Pesticide, propargite is a California Restricted Material per 3 CCR section 6400(a). Propargite is exempt from the requirement for a Restricted Materials Permit per 3 CCR section 6414 (b). All other requirements for California Restricted Materials apply.

FAC: California Food and Agricultural Code

HSC: California Health and Safety Code

CCR: California Code of Regulations

Additionally, propargite is a Category I pesticide bearing the label statement "Corrosive. Causes irreversible eye damage. Causes skin burns." Therefore, propargite requires the use of a tier two closed system when mixing and loading, as per title 3 CCR Section 6746(c).

There is also a noteworthy regulatory requirement for cotton fieldworkers to wear protective clothing, even after the REI has expired. Title 3, CCR section 6772(b) includes the following requirement within footnote "G":

> "The restricted entry interval for cotton fields treated with propargite is seven days. However, from the end of the restricted entry interval until the beginning of harvest, the employer shall assure that employees entering propargite treated cotton fields wear work clothing with long sleeves and legs and gloves."

IV. Pesticide Use and Sales

California's Pesticide Use Reporting (PUR) system shows propargite has a large range of uses on agricultural commodities. Available California pesticide use reports for the past five years (2010-2014) indicate a total of 1,381,318 lbs of propargite AI was applied with the majority of applications occurring between May and September (Figure 1). The average annual use was 276,263 lbs AI and the average annual amount sold was 254,158 lbs AI. Almonds, corn, and walnuts were the major use crops constituting 86 percent of the total amount applied (Table 2). The five counties with the highest reported use of propargite during 2010-2014 were Fresno, Kern, Merced, San Joaquin, and Tulare, constituting 75 percent of the total pounds of active ingredient applied in the five year period (Table 3).

Figure 1: Average Pounds of Propargite AI Used by Month for 2010-2014

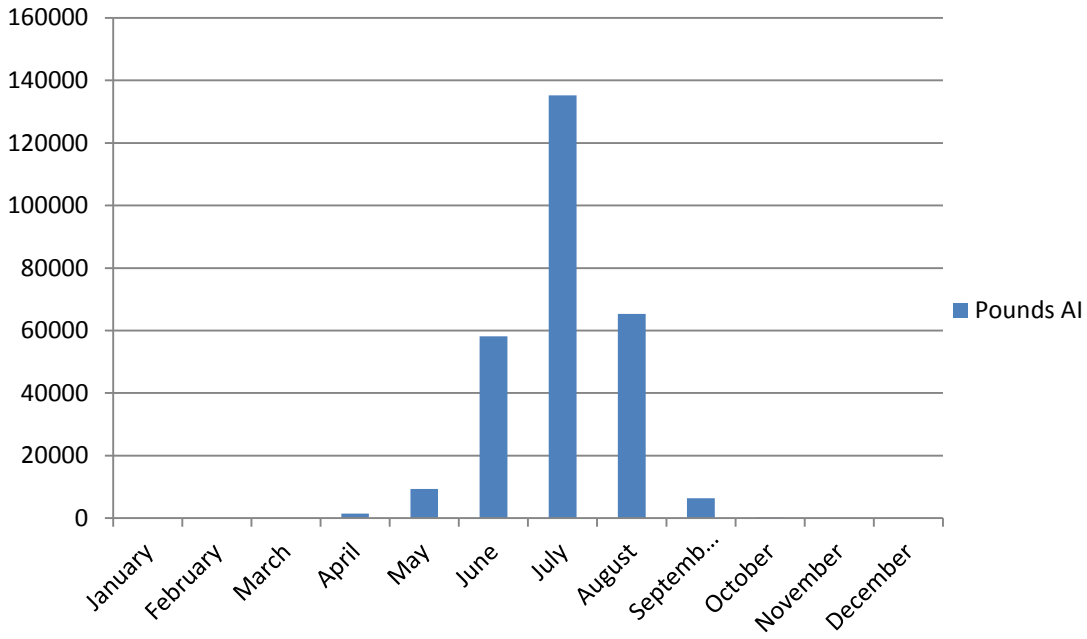

Table 2: Pounds of Propargite AI applied by crop in California for 2010-2014

Crop	2010	2011	2012	2013	2014	Total
Corn	171,361	193,337	142,437	99,805	70,539	**677,477**
Almond	50,945	20,474	36,845	112,889	83,761	**304,914**
Walnut	35,686	24,328	49,160	40,210	59,535	**208,919**
Alfalfa	8,365	27,635	6,091	18,242	12,359	**72,692**
Grapes	8,260	6,393	4,052	4,888	5,531	**29,125**
Cherry	4,468	3,060	5,953	5,788	9,146	**28,416**
Cotton	3,082	13,796	2,284	2,891	296	**22,384**
Beans	5,740	5,116	2,588	2,164	174	**15,782**
Nectarine	4,968	1,177	662	402	1,618	**8,828**
Sorghum	0	8	888	1,573	2,130	**4,608**
Peach	635	404	26	472	160	**1,698**
Wheat	0	0	0	665	0	**665**
Mint	369	0	226	0	0	**564**
Orange	0	0	147	0	0	**147**
Plum	100	0	0	7	0	**107**
Apple	0	0	78	0	0	**78**
Melons	52	0	0	0	0	**52**
Peanuts	1	2	2	2	5	**10**
Apricot	8	0	0	0	0	**8**
Persimmon	0	0	0	8	0	**8**
Non-Crop/ Other	1,269	653	871	1,034	994	**4,840**
Total	**295,309**	**296,384**	**252,251**	**291,119**	**246,254**	**1,381,318**

Table 3: Top Five counties with Highest Use of Propargite in California for 2010-2014

County	2010	2011	2012	2013	2014
Tulare	68,382	92,796	50,127	29,698	37,505
Fresno	60,883	35,935	36,159	56,269	63,040
San Joaquin	46,150	30,721	59,998	43,666	58,659
Merced	24,874	30,501	33,249	33,714	24,580
Kern	6,248	5,062	6,947	79,859	22,131

V. Products and Formulations

As of September 2016, there are three products registered in California (Table 4) and four Special Local Needs, Section 24(c) (SLN) registrations (Table 5). All products are manufactured by Chemtura.

Table 4: Propargite Products Registered in California

Name	Formulation	EPA Registration No.	Percent Active Ingredient
Comite	Emulsifiable Concentrate	400-104	73.6
Omite-6E	Emulsifiable Concentrate	400-89	69.2
Omite 30WS	Wettable Powder (Water Soluble Bag)	400-427	32.0

Table 5: Special Local Needs (24(c)) Registrations for Propargite

Product	Special Local Need No.	Commodity	Pest Species
Comite	CA-830024	Alfalfa Seed	Two Spotted Spider Mite
Comite	CA-940031	Non-Bearing Almonds/Walnuts	Spider Mites
Comite	CA-040013	Clover Seed	Two Spotted Spider Mite
Comite	CA-820083	Cotton	Two Spotted Spider Mite

VI. Label and Regulatory Requirements

Propargite is only approved for agricultural use. All three propargite products registered in California are listed as Category I "Danger" products and are federally restricted use pesticides due to eye and skin effects. They can be applied via ground or aerial application equipment. Chemigation of propargite is prohibited in California: both emulsifiable concentrate labels state "not in CA" for chemigation, and labels of the water-soluble-bag formulation state "Do not apply this product through any type of irrigation system."

There are several label restrictions to avoid spray drift to non-target areas when propargite products are applied. These include buffer zones around bodies of water and wind speed restrictions. These products are not allowed to be applied by ground within 50 feet, or by air within 75 feet, of bodies of water such as lakes, reservoirs, rivers, permanent streams, marshes or natural ponds, estuaries or commercial fish farm ponds. Additionally, propargite may not be applied when wind speeds exceed 15 miles per hour.

All three agricultural use products require applicators and other handlers to wear the following personal protective equipment (PPE):

- Long-sleeved shirt and long pants
- Shoes plus socks
- Goggles, faceshield, or safety glasses
- Chemical-resistant gloves (except flaggers and applicators in an enclosed cab)
- Chemical-resistant apron for mixers and loaders and persons exposed to the concentrate

However, when handling an emulsifiable concentrate, such as Comite and Omite 6E, applicators and other handlers are also required to use the following:

- Coveralls
- Chemical-resistant footwear and socks
- Chemical-resistant headgear for overhead exposure

In addition, labels require that mixer/loaders of emulsifiable concentrates who are supporting aerial applications to corn or cotton, must use a closed mix/load system. In California, that label requirement is moot, because of a broader regulatory requirement. As previously stated, title 3 CCR Section 6746(c) requires all propargite mixer/loaders to use Tier 2 closed mix/load systems. Mixer/loaders who handle one gallon or less per day are exempt.

When handlers use closed systems, closed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [Code of Federal Regulations, title 40, section 170.240(d)(4-6)][1], the handler PPE requirements may be modified as specified in the WPS.

All of the PPE and engineering-control requirements listed above were included on the propargite product labels in effect when DPR conducted its RCD (Lewis 2014). Therefore, the

[1] Code of Federal Regulations, title 40, section 170.240(d)(4-6) has been revised to section number 170.607 (d) and (e) effective January 2, 2017.

risk estimates in the RCD are based on the assumption that handlers will follow those restrictions. In December 2014, subsequent to the RCD, registrants amended the Federal labels of all three propargite products. However, the December 2014 amendments do not affect the risk estimates from the RCD, because the amendments did not alter PPE or engineering-control requirements. Rather, the December 2014 label amendments were limited to implementing protections for salmonid fish (NMFS 2015). In addition, effective January 2016, DPR amended 3 CCR section 6746. However, for propargite, the regulation amendment merely removed the requirement that the closed mix / load system be capable of rinsing the emptied pesticide container. For a discussion of possible future updates to risk estimates from the RCD, see section VIII of this scoping document.

Application rates for crops on the label for the three products vary from 0.55 to 3.2 lbs AI per acre. The labels allow 1 to 2 applications per year for most crops, with a maximum of 3 applications (e.g., for cotton, non-bearing apples, and non-bearing strawberries).
Propargite has California-specific REIs established by the regulation 3 CCR 6772, which are different from those on the federal label:

- Apples: regulatory REI is 21days;
- Citrus: regulatory REI is 42 days;
- Corn and cotton: regulatory REI is 7 days;
- Grapes: regulatory REI is 30 days;
- Peaches and nectarines: regulatory REI is 21 days;
- Strawberries and field-grown roses*: regulatory REI is 3 days; and
- All other crops: regulatory REI is 21 days.

*The current product label for Omite 30WS establishes an even-more-restrictive REI for field-grown roses of 14 days.

When both label and regulatory requirements apply, users must follow whichever requirement is more restrictive (more protective). Thus, propargite users must follow whichever REI is longer: the relevant label or the regulation.

Product labels specify the preharvest intervals (PHI), which range from 7 to 50 days. Table 6 summarizes PHIs and REIs, taking into consideration both labels and regulations.

Table 6: Restricted Entry and Preharvest Intervals for Propargite in California

Crop	Restricted Entry Interval (Days)	Preharvest Interval (Days)
Potatoes	21	14
Sorghum	21	30 (Silage) /45 (Grain)
Field Corn	13	30
Sweet Corn	13	30
Cotton	7	50
Jojoba	21	none (non-food commodity)
Beans	21	14
Almonds	22	28
Hops	21	14
Mint	21	14
Walnuts	30/21 (Tree shaking only)	21
Non-Bearing Berries	21	NA
Non-Bearing Citrus	42 (3 CCR 6772)	NA
Non-Bearing Currants/Dates/Figs	21	NA
Non-Bearing Nut Trees	22	NA
Non-Bearing Persimmons	21	NA
Non-Bearing Tree Fruit	21	NA
Conifers	21	NA
Grapes	30	21
Nectarines	21	14
Peanuts	21	14
Oranges and Grapefruit (bearing)	42 (3 CCR 6772)	7 (Omite 30WS label)
Roses	14 (applications under Omite-30WS label)	none (non-food commodity)
Alfalfa (Seed)	21 (Comite SLN)	none (non-food commodity)
Clover (Seed)	21 (Comite SLN)	none (non-food commodity)

NA = Not Applicable, because no harvest from non-bearing crops

VII. Potential Exposure Scenarios

Propargite products are only labeled for agricultural use. No propargite uses are registered for residential, recreational, or other public settings in the United States. Given this information the propargite exposure scenarios are grouped as follows:

1. Occupational handlers,
2. Occupational non-handlers such as fieldworkers, and
3. Bystanders, such as residents, to nearby or to ambient airborne propargite particles.

For each exposure scenario, the RCD estimated the risks of three separate health effects (Lewis 2014, pages 6-7):

1) **Local dermal effects (such as skin burns).** Risk was estimated via a Margin of Exposure (MOE) that incorporated a *relatively small uncertainly factor of 30* (10X for intraspecies variability, and 3X to protect against possible dermal sensitization, but no additional factor for interspecies variability). The larger the MOE, the lower the risk.
2) **Systemic non-cancer effects** (such as reduced body weights and labored breathing). The exposure route for systemic effects can be via dermal, oral, inhalation, dietary, or combined exposure. Risk of systemic effects was estimated via a MOE that incorporates

a *larger uncertainty factor of 100* (10X for intraspecies variability, and an additional 10X factor for interspecies variability). Again, the larger the MOE, the lower the risk.

3) **Cancer**, for which estimated risk is expressed as the rate of excess cancer predicted within the target population (cancer cases per number of people). The exposure route for cancer can be via dermal, oral, inhalation, dietary, or combined exposure. Because cancer risk is an actual rate of illness instead of an MOE, the larger the cancer rate, the greater the risk. For example, a cancer rate of 10^{-5} (one in ten thousand) indicates a greater risk than a rate of 10^{-6} (one in a million).

In summary, the RCD concluded that estimated risks were relatively high for occupational exposure scenarios for all three effects (Lewis 2014, page 8):

- The MOEs were generally low (i.e., estimated risks were higher than corresponding uncertainty factors) for systemic effects from occupational exposure, especially for the dermal exposure route (both seasonal and chronic dermal exposure). Inhalation exposure was also a concern for some handler scenarios, especially applicators for aerial and airblast application.
- There is some concern about the risk for local dermal effects from occupational exposure, especially to the hands of applicators and mixer/loader/applicators.
- Cancer risk estimates for all occupational exposure scenarios were high enough to suggest mitigation should be considered.

Occupational Handler Exposure Scenarios

For the purpose of this document, agricultural handlers include those workers who are involved in the application of propargite to agricultural sites. Occupational handler activities associated with the use of propargite formulations are shown in Table 7.

The RCD calculated MOEs for systemic exposure and local dermal exposure to applicators (Appendix A) mixer/loaders (Appendix B) and mixer/loader/applicators (Appendix C). The majority of the MOEs that were below the relevant uncertainty factor were related to the use of water-soluble bags (WSB) and aerial or airblast application methods.

Table 7: Agricultural Handler Scenarios for Propargite

Handler Activity	Emulsifiable Concentrate Formulation	Wettable Soluble Formulation
Aerial Applicator	X	X
Airblast Applicator	X	X
Ground Boom Applicator	X	X
Airblast Mixer/Loader	X	X
Aerial Mixer/Loader	X	X
Ground Boom Mixer/Loader	X	X
Mixer/Loader/Applicator[a]		X
Flagger	X	X

a Mixer/loader/applicator using Omite-30WS included for completeness only. This scenario is not considered practical since the entire soluble bag must be used and each bag calls for a minimum of 17 gallons of spray solution per acre. One possibility of such use is when a high or low pressure hand wand is attached to a tank with a capacity for 20 or more gallons of solution, or when the spray solution is prepared in a sufficiently large mixing tank from which the solution is poured into a backpack tank several times during the course of the pesticide application.

Occupational Non-Handlers (Fieldworkers) Exposure Scenarios

Non-handlers are workers who may be exposed to pesticides following an application, and who may be exposed to pesticide residues or pesticide drift. Agricultural fieldworkers (reentry workers) who enter treated fields following an application are included in this group. The exposure scenarios during the reentry to treated fields depend mainly on the time of reentry following an application, the crop, and the type of activities the worker is allowed to perform.

The REI on the label or in 3 CCR 6772 specifies the earliest time of entry by unprotected workers into treated agricultural fields following an application. Fieldworkers protected by appropriate PPE may be allowed to enter before the REI expires within the restrictions specified on the label and the Federal Worker Protection Standard. The crop and the type of work activity help determine the level of contact with treated surfaces. These work activities include harvesting, pruning, detasseling, scouting, cane turning, and transplanting.

Representative reentry scenarios for propargite, based on REI or PHI, and their associated MOEs for systemic non-cancer effects, are listed in Table 8. All seasonal and chronic MOEs were below the uncertainty factor of 100, indicating relatively high risk (Lewis 2014, page 7). Similarly, cancer risks were higher than 10^{-6} for every reentry scenario, with orders of magnitude ranging from 10^{-5} to 10^{-3} (Lewis 2014, Table 35).

Table 8: Representative Reentry Scenarios for Propargite, with MOEs for systemic effects
(source: Table 32 of Lewis 2014)

Reentry Scenario	Earliest Reentry (days)[a]	Scope of Activities	MOEs for systemic effects (in **bold font** if lower than uncertainty factor of 100)		
			Acute MOE	Seasonal MOE	Chronic MOE
Corn harvesters	30 (PHI)	harvesting corn by hand	260	**3**	**6**
Corn detasselers	7	detasseling corn by hand	**63**	**< 1**	**2**
Cotton/corn scouts	7	not for scouting other crops	710	**10**	**19**
Grape cane turners/girdlers	30	turning canes and girdling for all grape types	470	**6**	**18**
Grape harvesters/other cultivators	30	including all other related activities	930	**12**	**35**
Nectarine harvesters	21	harvesting by hand	440	**5**	**16**
Nectarine pruners/leaf thinners	21	including cherries and all other related activities	220	**3**	**8**
Citrus pruners/leaf thinners	42	for oranges and grapefruit during post-harvest	230	**3**	**15**
Rose harvesters	7	harvesting/cutting field-grown (for aerial spray)	**50**	**< 1**	**2**
Jojoba harvesters	21	harvesting by hand	290	**3**	**14**
Christmas tree transplanters	21	including conifers for plantation	3,000	**38**	**90**
Strawberry transplanters	10	transplanting non-bearing strawberries	1,300	**16**	**39**
Dry bean harvesters	21	mechanical harvesting	940	**13**	**40**
Almond harvesters	28	(mechanical) floor shaking and sweeping	830	**10**	**24**
Walnut harvesters	21	(mechanical) floor shaking and sweeping	530	**7**	**16**
Potato/peanut harvesters	21	mechanical harvesting	530	**7**	**16**
Alfalfa/clover seed harvesters	21	mechanical harvesting	530	**7**	**16**
Grain sorghum harvesters	21	mechanical harvesting	530	**7**	**16**
Irrigators/other cultivators	21	including all not mentioned above in this table	530	**7**	**16**

a The earliest reentry used for calculating estimated exposure, as stated in Table 22 and related text in (Lewis 2014). Note that REI may be shorter than PHI. During the interval between the REI and the PHI, fieldworkers may enter to conduct crop management activities other than harvesting.

Bystander Exposure Scenarios

Propargite is not registered for use in residential or other public settings. Therefore, bystander exposure is only expected to occur from ambient air exposure (inhalation), or drift from nearby agricultural applications (inhalation or dermal exposure). Estimated bystander risks were relatively low: all bystander MOEs for systemic non-cancer effects were substantially higher than the uncertainty factor of 100 (Appendix D). Similarly, bystander cancer risks were relatively low, ranging from 5.5 to 7.8 excess cancer cases in a million.

VIII. Possible Future Updates to Risk Estimates

Occupational handlers (including applicators and mixer / loaders):

RCD risk estimates for handlers were calculated using exposure estimates from the Pesticide Handler Exposure Database, PHED (Dong 2013). Since 2001, the Agricultural Handler Task Force (AHETF) has been working to develop pesticide-exposure databases to replace PHED. U.S. EPA has reviewed and accepted some, but not all, AHETF monographs. U.S. EPA states that it:

> "currently uses values presented in the PHED Surrogate Guide as the basis for most pesticide handler exposure assessments. However, the Agency believes that given changes in cultural production practices over time and the limitations of the data contained in PHED, it is appropriate that more current information be used for these types of assessments as they become available" (EPA 2016).

Accordingly, U.S. EPA already has begun incorporating certain AHETF exposure estimates into its reference tables (EPA 2015). If DPR managers determine that mitigation is necessary, RCD risk estimates for handlers may need to be re-calculated if U.S. EPA has approved additional AHETF exposure estimates.

Occupational mixer / loaders:

At the time of the RCD, 3 CCR section 6746 required a closed system when mixing or loading any Category 1 pesticide, including propargite (Dong 2013, page 4). The closed system was required to be capable of removing and transferring the pesticide and rinsing the emptied pesticide container. That version of 3 CCR 6746 exempted mixer / loaders who handled, "a total of one gallon or less of pesticides in toxicity category one per day" (DPR 2014).

Effective January 2016, DPR amended 3 CCR 6746. The amended version still exempts, "An employee required to use a Tier 2 closed mixing system if the employee handles a daily maximum of one gallon or less". For propargite, the amendment merely removed the requirement that the closed mix / load system be capable of rinsing the emptied pesticide container. The current, amended version of 3 CCR 6746 requires propargite mixer / loaders to use a Tier 2 closed system, "capable of enclosing the pesticide while removing the contents from its original container, preventing the pesticide from contacting handlers". Elimination of the requirement for a system capable of rinsing the emptied container may require mixer / loader risk estimates to be re-calculated if DPR managers determine that mitigation is necessary.

Occupational reentry:

To calculate estimated risks for occupational reentry scenarios, the RCD used transfer coefficients from Appendix II of DPR's exposure assessment for propargite (Dong 2013). Subsequent to the RCD, in March 2016, DPR policy was updated (Kwok 2016) and DPR risk assessors were instructed to begin using transfer coefficients from U.S. EPA's ExpoSAC Policy 3 (EPA 2013). Therefore, reentry risk estimates may need to be recalculated if mitigation is deemed necessary, including both cancer risks and the non-cancer risks listed in Table 8.

For the crop of cotton, DPR's Exposure Assessment used cotton scouting as the representative reentry scenario (Dong 2013, Table I-C). If mitigation is deemed necessary, a separate fieldworker reentry scenario should also be calculated for cotton. The reason is, 3 CCR section 6772(b) includes the following requirement within footnote "G":

> "The restricted entry interval for cotton fields treated with propargite is seven days. However, from the end of the restricted entry interval until the beginning of harvest, the employer shall assure that employees entering propargite treated cotton fields wear work clothing with long sleeves and legs and gloves."

The requirement for protective apparel apparently was not considered when calculating exposure for cotton scouts (Dong 2013). Any future recalculations should consider the effect of that requirement for cotton fieldworkers who carry out non-scouting duties such as mechanical harvesting, irrigating, or weeding/roguing (Dong 2013, Table I-B).

IX. Pesticide Illness Reports

Reports of illnesses and injuries associated with exposure to pesticide products are maintained in the Pesticide Illness Surveillance Program (PISP) database of DPR. The RCD summarized reported illnesses from 1982 to 2010. During that 28-year period, there was an average of 38 illness cases per year associated with propargite (Lewis 2014). In subsequent years, from 2011 through 2014 (the most recent year for which PISP data are available), a total of two incidents and four cases associated with propargite were reported to PISP:

- In 2012, three fieldworkers working in a vineyard noticed a tractor spraying approximately 100 feet away and experienced symptoms including irritation of mouth and skin, headache, and nausea. The tractor driver was applying imidacloprid and propargite. Residue samples from the foliage and workers' clothes confirmed drift.
- In 2013, a fieldworker was picking beans in a field while an application of oxydemeton-methyl and propargite was being conducted ¼ mile away. The fieldworker sought medical care after experiencing symptoms including dizziness, headache, and nausea.

X. References

Dong, M.H. 2013. *Human Pesticide Exposure Assessment: Propargite. Revision No. 1.* Medical Toxicology Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento CA. Available at: http://www.cdpr.ca.gov/docs/risk/rcd/propargite_ead_final.pdf

DPR (Department of Pesticide Regulation). 2014. Text of Proposed Regulations, DPR 14-004 Closed Mixing Systems. Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento CA. Available at: http://www.cdpr.ca.gov/docs/legbills/rulepkgs/14-004/14-004.htm (accessed August 29, 2016).

DPR. Accessed July 2016. *Pesticide Use Reporting (PUR), Pesticide Use Annual Summaries (2008-2012).* Department of Pesticide Regulation, California Environmental Protection Agency. Available at: http://www.cdpr.ca.gov/docs/pur/purmain.htm

DPR. Accessed July 2016. *California Product/Label Database Queries & Lists* (search for active propargite products). Department of Pesticide Regulation, California Environmental Protection Agency. Available at: http://www.cdpr.ca.gov/docs/label/labelque.htm

DPR. Accessed July 2016. *Reports of Pesticides Sold in California* (2008-2012). Department of Pesticide Regulation, California Environmental Protection Agency. Available at: http://www.cdpr.ca.gov/docs/mill/nopdsold.htm

DPR. Accessed July 2016. *California Pesticide Information Portal (CalPIP), Pesticide Use Report.* Website accessed for database queries on several dates. Department of Pesticide Regulation, California Environmental Protection Agency. Available at: http://calpip.cdpr.ca.gov/main.cfm

Kwok, E.S.C. 2016. *Exposure Assessment Policy and Procedure – An Update to Default Transfer Coefficients*. Human Health Assessment Branch, California Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento. Available at: http://www.cdpr.ca.gov/docs/hha/memos/exposure_assessment.pdf (accessed August 10, 2016).

Lewis, C.M. 2004. *Propargite (Omite): Dietary Risk Characterization Document*. Medical Toxicology Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento CA. Available at: http://www.cdpr.ca.gov/docs/risk/rcd/propargite_2004.pdf

Lewis, C.M. 2014. Propargite (Omite): Occupational, Ambient, and Aggregate Exposure Risk Characterization Document. Medical Toxicology Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento CA. Available at: http://www.cdpr.ca.gov/docs/risk/rcd/propargite_2014.pdf

NMFS (National Marine Fisheries Service). 2015. *National Marine Fisheries Service Endangered Species Act Section 7 Consultation and Biological Opinion: Environmental Protection Agency's Registration of Pesticides Containing Diflubenzuron, Fenbutatin Oxide, and Propargite.* National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Washington D.C. Available at: http://www.nmfs.noaa.gov/pr/consultation/opinions/pesticides_biop_7_1_7_2015.pdf (accessed August 10, 2016).

Prichard, A. 2014. *Notice to Pesticide Registrants Regarding Initiation of Risk Assessment Process for the Active Ingredient Propargite. California Notice 2014-17.* Sacramento, CA: Pesticide Registration Branch, Department of Pesticide Regulation, California Environmental Protection Agency. Available at: http://www.cdpr.ca.gov/docs/registration/canot/2014/ca2014-17.pdf

U.S. EPA. 2008. *Pesticide Reregistration Status: Amended Propargite Reregistration Eligibility Decision Document.* Washington, DC. Available at: http://www.epa.gov/pesticides/reregistration REDs/propargite_amend_red-10-09-08.pdf

U.S EPA. 2013. *Science Advisory Council for Exposure (ExpoSAC) Policy 3*. Science Advisory Council for Exposure, U.S. Environmental Protection Agency, Washington D.C. Available at: https://www.epa.gov/sites/production/files/2015-08/documents/exposac-policy-3-march2013.pdf (accessed August 10, 2016).

U.S. EPA. 2015. *Occupational Pesticide Handler Unit Exposure Surrogate Reference Table*. Office of Pesticide Programs, U.S. Environmental Protection Agency, Washington D.C. Available at: https://www.epa.gov/sites/production/files/2015-09/documents/handler-exposure-table-2015.pdf (accessed August 29, 2016).

U.S. EPA. 2016. *Occupational Pesticide Handler Exposure Data*. U.S. Environmental Protection Agency, Washington D.C. Available at: https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/occupational-pesticide-handler-exposure-data (accessed August 29, 2016).

Appendix A

Estimated Margins of Exposure for Systemic Effects in Propargite[a] Applicators
(in bold font if lower than the uncertainly factor of 100)

Exposure Scenarios	Acute		Seasonal		Chronic	
	Derm.[b]	**Inhal.[b]**	**Derm.**	**Inhal.**	**Derm.**	**Inhal.**
EC[c]						
Aerial	**29**	**7**	**< 1**	**18**	**3**	100
Airblast	**47**	**11**	**2**	**46**	**6**	260
Groundboom	1,100	**48**	**44**	190	130	1,100
WSB[c]						
Aerial	**3**	**8**	**< 1**	**21**	**< 1**	110
Airblast	**4**	**11**	**< 1**	**43**	**< 1**	240
Groundboom	91	**40**	**4**	160	**11**	900

a From RCD Table 26 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. After adjusting for dermal absorption, the acute, seasonal and chronic dermal NOELs were 17 mg/kg (rabbits - no clinical signs or body weight reductions after 1 week of exposure), 0.17 mg/kg/day (rabbits - reduced body weights, changes in clinical chemistry and hematology and increased kidney and liver weights), and 0.17 mg/kg/day (same as subchronic), respectively. Inhalation exposure was evaluated using the following acute, seasonal and chronic oral NOELs: 0.8 mg/kg (pregnant rabbit - maternal: anorexia, adipsia; fetal: delayed ossification), 0.8 mg/kg/day (pregnant rabbit - maternal; anorexia, adipsia, reduced body weight gain and reduced survival), and 1.5 mg/kg/day (rats: reduced body weights and food consumption), after adjusting for oral absorption (40%). The exposure dosages are from RCD Table 16. Values were rounded to two significant figures or the nearest whole number if less than 10.

b Derm. = Total dermal exposure including hand exposure; Inhal. = Inhalation exposure.

c EC = Emulsifiable Concentrate; WSB = Water Soluble Bag.

Estimated Margins of Exposure for Local Dermal Effects in Propargite[a] Applicators
(in bold font if lower than the uncertainly factor of 30)

Exposure Scenarios	**Acute**		**Seasonal**	
	Body[b]	**Hand**	**Body**	**Hand**
EC[c]				
Aerial	170	**4**	150	**3**
Airblast	160	**10**	190	**12**
Groundboom	7,000	130	10,000	150
WSB[c]				
Aerial	**19**	**< 1**	**17**	**< 1**
Airblast	**15**	**1**	**18**	**1**
Groundboom	580	**11**	700	**13**

a From RCD Table 29 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. The acute and subchronic NOELs for dermal irritation were 700 :g/cm^2 (rabbits) and 210 :g/cm^2 (rabbits), respectively. The estimated dermal concentration for the body and hands are from RCD Table 19. Values were rounded to two significant figures or the nearest whole number if less than 10.

b Body = MOE for dermal irritation on the body, except the hands.

c EC = Emulsifiable Concentrate; WSB = Water Soluble Bag.

Appendix B

Estimated Margins of Exposure for Systemic Effects in Mixer/Loaders Exposed to Propargite[a]
(in bold font if lower than the uncertainty factor of 100)

Exposure Scenarios	Acute		Seasonal		Chronic	
	Derm.[b]	Inhal.[b]	Derm.	Inhal.	Derm.	Inhal.
EC[c]						
Aerial	180	**43**	**7**	170	**21**	980
Airblast	530	120	**21**	500	**64**	2,800
Groundboom	970	250	**39**	1,000	120	3,000
WSB[c]						
Aerial	**32**	**17**	**<1**	42	**2**	230
Airblast	**79**	**42**	**2**	100	**6**	590
Groundboom	130	**67**	**3**	170	**10**	940

a From RCD Table 27 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. After adjusting for dermal absorption, the acute, seasonal and chronic dermal NOELs were 17 mg/kg (rabbits - no clinical signs or body weight reductions after 1 week of exposure), 0.17 mg/kg/day (rabbits - reduced body weights, changes in clinical chemistry and hematology and increased kidney and liver weights), and 0.17 mg/kg/day (same as subchronic), respectively. Inhalation exposures were evaluated using the following acute, seasonal and chronic oral NOELs: 0.8 mg/kg (pregnant rabbit - maternal: anorexia, adipsia; fetal: delayed ossification), 0.8 mg/kg/day (pregnant rabbit - maternal; anorexia, adipsia, reduced body weight gain and reduced survival), and 1.5 mg/kg/day (rats: reduced body weights and food consumption), after adjusting for oral absorption (40%). The exposure dosages are from RCD Table 17. Values were rounded to two significant figures or the nearest whole number if less than 10.

b Derm. = Total dermal exposure including hand exposure; Inhal. = Inhalation exposure.

c EC = Emulsifiable Concentrate; WSB = Water Soluble Bag.

Estimated Margins of Exposure for Local Dermal Effects in
Mixer/Loaders Exposed to Propargite[a]
(in bold font if lower than the uncertainty factor of 30)

Exposure Scenarios	Acute		Seasonal	
	Body[b]	Hand	Body[a]	Hand
EC[c]				
Aerial	1,800	**18**	2,100	**22**
Airblast	7,000	55	7,000	66
Groundboom	12,000	99	10,000	120
WSB[c]				
Aerial	65	470	49	520
Airblast	160	1,200	120	1,000
Groundboom	270	1,800	210	2,600

a From RCD Table 30 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. The acute and subchronic NOELs for dermal irritation were 700 :g/cm^2 (rabbits) and 210 :g/cm^2 (rabbits), respectively. The estimated dermal concentration for the body and hands are from RCD Table 20. Values were rounded to two significant figures or the nearest whole number if less than 10.

b Body = MOE for dermal irritation on the body, except the hands. c

c EC = Emulsifiable Concentrate; WSB = Water Soluble Bag.

Appendix C

Estimated Margins of Exposure for Systemic Effects in Mixer/Loader/Applicators and Human Flaggers Exposed to Propargite[a]
(in bold font if lower than the uncertainty factor of 100)

Exposure Scenarios	Acute		Seasonal		Chronic	
	Derm.[b]	Inhal.[b]	Derm.	Inhal.	Derm.	Inhal.
Flagger						
EC[c]	150	**26**	**6**	100	**18**	580
WSB[c]	**17**	**29**	**<1**	120	**2**	650
Mixer/Loader/Applicator						
Low Pressure	210	**24**	**10**	120	**31**	670
High Pressure	**90**	**33**	**2**	**82**	**7**	460
Backpack	120	1,300	**4**	4,000	**10**	22,000

a From RCD Table 28 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. After adjusting for dermal absorption, the acute, seasonal and chronic dermal NOELs were 17 mg/kg (rabbits - no clinical signs or body weight reductions after 1 week of exposure), 0.17 mg/kg/day (rabbits - reduced body weights, changes in clinical chemistry and hematology and increased kidney and liver weights), and 0.17 mg/kg/day (same as subchronic), respectively. Inhalation exposure was evaluated using the following acute, seasonal and chronic oral NOELs: 0.8 mg/kg (pregnant rabbit - maternal: anorexia, adipsia; fetal: delayed ossification), 0.8 mg/kg/day (pregnant rabbit - maternal; anorexia, adipsia, reduced body weight gain and reduced survival), and 1.5 mg/kg/day (rats: reduced body weights and food consumption), after adjusting for oral absorption (40%). The exposure dosages are from RCD Table 18. Values were rounded to two significant figures or the nearest whole number if less than 10.

b Derm. = Total dermal exposure including hand exposure; Inhal. = Inhalation exposure.

c EC = Emulsifiable Concentrate; WSB = Water Soluble Bag.

Estimated Margins of Exposure for Local Dermal Effects in Mixer/Loader/Applicators and Human Flaggers Exposed to Propargite[a]
(in bold font if lower than the uncertainty factor of 30)

Exposure Scenarios	Acute		Seasonal	
	Body[b]	Hand	Body	Hand
Flagger				
EC[c]	350	89	420	100
WSB[c]	40	**10**	48	**12**
Mixer/Loader/Applicator				
Low Pressure	540	75	700	110
High Pressure	190	150	140	110
Backpack	230	23,000	210	21,000

a From RCD Table 31 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. The acute and subchronic NOELs for dermal irritation were 700 µg/cm^2 (rabbits) and 210 µg/cm^2 (rabbits), respectively. The estimated dermal concentration for the body and hands are from RCD Table 21. Values were rounded to two significant figures or the nearest whole number if less than 10.

b Body = MOE for dermal irritation on the body, except the hands.

c EC = Emulsifiable Concentrate; WSB = Water Soluble Bag.

Appendix D

Estimated Margins of Exposure for Bystanders (systemic effects via inhalation) near Application Sites Treated with Propargite[a] (all are above the uncertainty factor of 100)

Exposure Dosages	Infants	Adults
Acute - 1 hr	3,700	7,600
Acute - 24 hr	590	1,200
Seasonal	1,400	2,900
Chronic	7,600	16,000

a From RCD Table 36 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. Inhalation exposures were evaluated using the following acute, seasonal and chronic oral NOELs: 0.8 mg/kg (pregnant rabbit - maternal: anorexia, adipsia; fetal: delayed ossification), 0.8 mg/kg/day (pregnant rabbit - maternal: anorexia, adipsia, reduced body weight gain and reduced survival), and 1.5 mg/kg/day (rats - reduced body weights and food consumption), after adjusting for oral absorption (40%). The exposure dosages are from RCD Table 24. Values were rounded to two significant figures or the nearest whole number if less than 10.

Estimated Aggregate Margins of Exposure for the General Public (systemic effects) Exposed to Propargite[a] in the Diet, Drinking Water and Application Site Air (all are above the uncertainty factor of 100)

Exposure Dosages	Infants	Adults
Acute - 1 hr	760	1,200
Acute - 24 hr	210	330
Seasonal	1,100	2,300
Chronic	4,800	7,200

a From RCD Table 37 (Lewis 2014). Margin of Exposure (MOE) = NOEL / Exposure Dosage. Inhalation exposures were evaluated using the following acute, seasonal and chronic oral NOELs: 0.8 mg/kg (pregnant rabbit - maternal: anorexia, adipsia; fetal: delayed ossification), 0.8 mg/kg/day (pregnant rabbit - maternal: anorexia, adipsia, reduced body weight gain and reduced survival), and 1.5 mg/kg/day (rats - reduced body weights and food consumption), after adjusting for oral absorption (40%). The exposure dosages are from RCD Table 24. Values were rounded to two significant figures or the nearest whole number if less than 10.